ECON 572
Department of Economics

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Spring 2012

Econometrics II

This course is the second course in the three-semester econometrics sequence for the Economics PhD students. Classes will meet at 9:30-10:45am on Mondays and Wednesdays in KH312. The course is intended to teach extensively and rigorously the linear models, covering classical single equation models, multivariate regression models, seemingly unrelated regressions, panel data models, and simultaneous equation models. There is no required textbook for the course, and the lectures will follow closely the notes to be distributed at the beginning of the semester. For supplemental reading, the following books may serve as good references:

Basic Textbooks

Hayashi, F., *Econometrics*, Princeton University Press, 2000.

Greene, W.H., *Econometric Analysis*, 7th ed., Prentice Hall, 2011.

Davidson, R. and J.G. MacKinnon, *Econometric Theory and Methods*, Oxford University Press, 2004.

Wooldridge, J.M., *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., MIT Press, 2008.

Goldberger, A., *A Course in Econometrics*, Harvard University Press, 1991.

Sargan, D., *Lectures on Advanced Econometric Theory*, Basil Blackwell, 1988.

Reference Books

Billingsley, P., *Probability and Measure*, 3rd ed., Wiley, 1995.

Dhrymes, P.J., *Topics in Advanced Econometrics: Probability Foundations*, Springer-Verlag, 1989.

Dhrymes, P.J., *Topics in Advanced Econometrics: Vol II. Linear and Nonlinear Simultaneous Equations*, Springer-Verlag, 1994.

Gallant, R.A., *An Introduction to Econometric Theory*, Princeton University Press, 1997.

Halmos, P.R., *Finite-Dimensional Vector Spaces*, Springer-Verlag, 1974.

Magnus, J.R. and H. Neudecker, *Matrix Differential Calculus with Applications in Statistics and Economics*, John Wiley & Sons, 1988.

Muirhead, R.J., *Aspects of Multivariate Statistical Theory*, John Wiley & Sons, 1982.

White, H., *Asymptotic Theory for Econometricians*, Academic Press, 1984.

GRADING: Assignments (20%, exercises, due one week after distribution); Two midterm examinations (20% each, scheduled at class time on February 20 Monday and April 2 Monday); Final examination (40%, scheduled at 8-10am on May 4 Friday).

OFFICE HOURS: I will have office hours in my office (WY354) on Wednesdays at 2:30-4pm. Students who wish to meet me outside the office hours should email me in advance to make an appointment. My email address is yoosoon@indiana.edu.

TEACHING ASSISTANT: Jihyun Kim is assigned as the teaching assistant for the course. Jihyun will provide weekly review sessions and also hold office hours. He will coordinate with you later to decide when and where to meet. Students may meet him outside his office hours by making an email request for an appointment in advance. His email address is kimjihy@indiana.edu.

Course Contents

Part I: Univariate Linear Models

1. CLASSICAL REGRESSION MODELS

The Model, Ordinary Least Squares (OLS) Estimation, Maximum Likelihood (ML) Estimation, Decomposition of Squaring, Two Step Regression, Finite Sample Properties, Optimality, Asymptotics, Constrained Least Squares, Hypothesis Testing, Prediction.

2. GENERALIZED REGRESSION MODELS

The Model, Generalized Least Squares (GLS) Estimation, ML Estimation, GLS with AR(1) Errors, Statistical Results, Equivalence of OLS and GLS.

3. IV ESTIMATION

The Model, IV Estimator, IV-GLS Analogue.

Part II: Multivariate Linear Models

1. MULTIVARIATE REGRESSION MODELS

The Model, Multivariate LS Estimation, ML Estimation, Statistical Properties of the Estimators, Hypothesis Testing.

2. SEEMINGLY UNRELATED REGRESSIONS (SUR)

The Model, Estimation, Equivalence of SUR and Single-Equation LS.

3. REGRESSIONS WITH PANEL DATA

The Model, Fixed Effects Models, Random Effects Models.

Part III: Simultaneous Equation Models

1. Specification

The Model, Identification, Reduced Form (RF) and Structural Form (SF) Models, Representation.

2. Identification

Characterization of Observational Equivalence, First-Order Identification, Second-Order Identification, Identification of Sub-Structures, Identification of Sub-Structures with Zero-Covariance Restrictions.

3. Estimation by OLS and Indirect Least Squares (ILS)

The OLS and Simultaneous Equation Bias, ILS.

4. IV Estimation

Instrumental Variables, Single Equation IV Estimation, System IV Estimation.

5. ML Estimation

Full Information Maximum Likelihood (FIML) Procedure, Limited Information Maximum Likelihood (LIML) Procedure.